

Nutrition Strategies for Optimal Performance

(Some Surprising Findings) by Mike Lardy

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As the fall hunting season gets into full swing, we are less concerned about everyday training and more focused on getting the most out of our dogs under actual hunting conditions. Pre-season conditioning and training should prepare your dogs for the rigors ahead, but there's more you can do to achieve maximum performance.

I recently attended the Purina Sporting Dog Summit - a presentation on "Conditioning and Feeding for Optimal Performance." There were some interesting ideas presented, and some of them turned conventional wisdom right on its head.

Do you like to give your dog a light meal the morning of a vigorous hunt? How about some biscuits during a mid-day lunch break? What about adding vitamins or extra meat supplementation to your dog's regular food during the hunting season? You might be surprised to learn that all of these strategies might be doing more harm than good when trying to achieve maximum performance. But, there are some other relatively simple strategies for preparing your dog for each day's hunt.

So where do these ideas come from? Purina Nutrition Scientist Dr. Arleigh Reynolds has spent his career finding answers to questions about canine nutrition and conditioning. And while Dr. Reynolds' academic credentials are beyond reproach, don't expect to find him always huddled away conducting experiments on lab animals in sterile environments. No, Arleigh is a sled dog racer, and an accomplished one at that. So while Dr. Reynolds' research is published in peer-reviewed scientific journals, it's also put to the kind of rigorous practical test that only a competitive musher could make.

I asked Dr. Reynolds if research on sled dogs would be applied to retrievers. "If you look beyond their outward appearance and examine their muscles, bones, and circulatory systems, you'll find that there are far more similarities between your Labradors and my huskies than there are differences. In one of our studies we compared muscle structure and oxygen metabolism of Labradors and huskies and found them to be identical in the way they responded to changes in diet and training."

Dr. Reynolds presented several strategies for maximizing performance. And although it is clear that field trial retrievers could certainly benefit from these approaches, the upland hunting retriever has probably the most to gain from them. Food quality, timing of feedings, post-exercise energy repletion, and pre-exercise hydration are four areas where Dr. Reynolds has specific recommendations for improving performance.

Premium Dog Food

Dr. Reynolds was certainly "preaching to the choir" when he advocated feeding premium quality food to performance dogs to the group gathered at the Purina Summit. However, he shared with us the nutritional studies that document the importance of a high fat and protein diet for working dogs.

In brief, dogs fed a high-fat diet run farther and faster than those fed a low-fat diet. Dr. Reynolds explains, "Feeding a high-fat diet 'primes' a dog's metabolism to better use fat for fuel. This allows a greater power output from burning fat and spares more limited stores of carbohydrates [glycogen]. Feeding a high-fat instead of a high-carbohydrate diet while training can increase the maximum ability to burn fat as a fuel by 30 percent. Fat availability is also enhanced by a high fat diet. This feeding strategy allows a dog to perform longer at a higher intensity than would be possible if a high-carbohydrate diet was fed."

Most surprising to me was the observation that those dogs fed a high-fat diet were better prepared for exercise than those on a low fat diet, even when there was no conditioning program preceding the exercise. The message here is that you should feed premium quality dog food even during the off season, though you should reduce the amount to avoid weight gain.

Another study with sled dogs showed the significant effects of protein levels on soft tissue injury rates. In one study, every dog (100 percent) on an 18 percent protein diet suffered soft tissue injury during 12

weeks of training, while only 20 percent (one in five) of the dogs fed 24 percent protein did so; and the group fed 32 percent protein diets With the same training experienced no injuries whatsoever. Dr. Reynolds explains, "We don't completely understand the mechanism, but we do know that feeding what has until now been considered an adequate amount of protein [18 percent] did not support good health and performance during intensive conditioning. A minimum of 24 percent of the calories should come from protein, or the risk for injury increases and the ability to maximally metabolize oxygen decreases."

Dr. Reynolds concludes that, "Clearly, working dogs perform better with premium quality food containing 20-30 percent fat and 27-35 percent protein."

Dr. Reynolds also discouraged trainers from using excessive supplementation of vitamins and minerals. Premium quality dog foods contain sufficient quantities of them, and supplementation can actually throw a well-balanced food out of whack. In fact, he said, "It can be dangerous to give high levels of fat soluble vitamins such as A, D, and K. And excessive Vitamin C supplementation (over 500 mg/day) can lead to calcium stones." Dr. Reynolds also cited the case of a sled dog racer whose dogs developed carpal fractures when meat supplementation threw off the calcium-phosphorus balance in the diet.

Timing of Feedings

The most startling finding is that the endurance of sled dogs that fast for 24 hours prior to a race is *twice* that of dogs fed three, six, or nine hours before a race. This flies in the face of our intuition and calls into question the habit many of us have of feeding our dogs in the morning before hunting or training.

Dr. Reynolds explained that two factors can explain these results. First, the dog with an empty digestive tract has better biomechanics. Sled dog racers will monitor every dog the morning of the race to make sure they have stooled out completely; the dog with an empty colon is better prepared for the run. This is probably a smaller factor for retrievers than sled dogs, but every advantage may count on a day-long upland hunt. Also, the colon is less likely to be irritated by the exercise that follows. Certainly, we have all seen our hunting dogs have frequent and runny or even bloody stools after hours of hunting.

The second explanation has to do with biochemistry. Without explaining the details, Dr. Reynolds says, "Suffice it to say that the insulin spike in the bloodstream that follows eating can turn off the fat-mobilizing pathways. Since fat is the primary source of energy, the dog is less able to get the energy it needs."

This leads to the recommendation that you not feed your dog in the morning prior to vigorous exercise. This certainly is contrary to what so many of us do on demanding hunting days! I asked Dr. Reynolds if it was all right to give the dog a snack during a hunting outing. "If you feel the need to give a snack, give a high fat snack, such as a piece of sausage, no more than fifteen minutes before works. There won't be sufficient time for an insulin spike to occur before exercise commences." He also said you could give such a snack in the middle of the hunt. Of course, if your dog suffers from certain maladies, such as hypoglycemia, be sure to follow your veterinarian's recommendations.

So what do you do if you're hunting several days in a row? You certainly can't fast your dog for 24 hours prior to the second day's hunt. Dr. Reynolds faces the same dilemma when he races his sled dogs in sprints three days in a row. He says, "The key is to feed your dog as soon as possible after completing the day's hunt. Be sure your dog has cooled down completely; say after about forty-five minutes to an hour. This will maximize your fasting time before the next day's hunt."

For example, on a typical South Dakota pheasant hunt, you might be done at 5 p.m. Feed your dog at 6 p.m., and he'll have 16 hours before shooting opens the next day at 10. This means you feed your dog before cocktails and dinner, also a little unconventional.

Post-Exercise Energy Repletion

Here comes a little more biochemistry. Dr. Reynolds explains, "Glucose the energy source for muscle and the brain, is stored in the muscle and liver as glycogen. Glycogen is a readily available energy source, and it is easily depleted during exercise. Normal meal feedings will not restore glycogen levels between bouts of exercise on consecutive days."

This means that as you start each subsequent day's hunt, you are starting with less stored glycogen than the day before. To maximize endurance, you can take steps to restore glycogen supplies.

It turns out that the muscle cells are very receptive to glycogen following exercise, so immediate post-exercise carbohydrate supplementation can lead to replacement of 50 percent of depleted glycogen in the first four hours of recovery, and nearly complete recovery after 24 hours. In contrast, only 75-80 percent will occur after 24 when only normal meals are fed.

Dr. Reynolds uses maltodextrin mixed with water for post-exercise carbohydrate repletion. He recommends mixing about one ounce (a heaping 1/3 cup) of maltodextrin per 40 pounds of body weight mixed with two cups water. An 80-pound retriever would need about 3/4 cup mixed with four cups of water. He emphasizes that this supplementation must occur within 30 minutes, and preferably within 15 minutes, after exercise.

I asked him why you couldn't use a dog biscuit or bread as the carbohydrate source. "You want to be sure to use something that can be given in a reasonable volume and will be digested and absorbed rapidly. Dog biscuits and bread, depending on the specific product used, may contain too much fat, which would delay the emptying of the stomach into the intestine where absorption occurs. Also, since dog biscuits contain things other than carbohydrates, you may find that you need to give twelve to fifteen of them to get the 1.5g/kg body weight of carbohydrate needed to achieve your goal."

These findings have bearing for field trial dogs as well as hunting dogs. A retriever that runs a demanding test in the morning could be given post exercise carbohydrate supplementation and be better ready to run another demanding test in the afternoon.

Hydration

A tired, hot, and thirsty retriever isn't much of a bird finder. First, they seem *to* lose their nose; later they just plain lack interest in hunting. There are some steps *you* can take to prevent or delay dehydration.

Sled dog teams suffer from dehydration more than *you* might think at first. The cold arctic environment can be as dry as a desert. When individual dogs start getting thirsty, they start to reach *for* snow as they are running. This can throw off the gait of the other team members, resulting in a slower race time or even an injury from the sudden movement. Keeping the team well-hydrated is a top priority.

A strategy for achieving pre-exercise hydration involves the use of a one percent glycerol solution. Dr. Reynolds waters his dogs with the solution at least four hours before exercise, though it can be effective up to 24 hours before a race. Dr. Reynolds explains, "Glycerol binds itself to water molecules and is taken up by the cells. This means the dog is superhydrated before exercise. As the dog works, the glycerol is burned for Energy, releasing the water molecules into the cell." This means the dog stays hydrated much longer as the exercise proceeds.

Since dogs don't sweat in any significant way to cool down, Dr. Reynolds cautions against using highly concentrated electrolyte solutions either pre or post exercise. "Dogs don't lose electrolytes the way a human athlete does by sweating. You may actually increase dehydration with electrolyte supplementation."

Dr. Reynolds reminds trainers to follow the regime he recommends very carefully. "Glycerol can be dangerous to dogs if given in high concentrations. You must never mix more than a 1-1.5 percent solution or you could cause kidney damage." Because glycerol settles in a solution quickly, the one percent solution must be stirred before serving and promptly consumed. If the solution sits in a bowl, the glycerol will soon settle on the bottom. "I bait the solution with crumbled kibbles to encourage them to drink it quickly," he explains.

If given on a race morning, Dr. Reynolds insists that the glycerol be given three to four hours in advance of the race, and that the dog be offered "clear water" (without glycerol) two hours after the glycerol treatment. You'd like to see the dog consume 1-1½ quarts of the treated water.

As this fall season rolls around, I look forward to implementing Dr. Reynolds' regime. I can imagine the following scenario on an upland hunting trip:

- Lake afternoon feeding with just a little water on eve of first day's hunt. Say, 4 p.m.
- Water at 6-7 p.m. with one percent glycerol solution.
- Offer clear water at final airing at 9 p.m.
- Offer unlimited clear water in the morning.
- At conclusion of dog's last hunt, offer maltodextrin in baited water.
- Feed in late afternoon or after dog cools down if you hunt late, If you are feeding after 6 p.m., go ahead and feed with glycerol solution. Otherwise offer glycerol solution two hours after feeding and clear water at last airing.
- Repeat each day.

This sophisticated approach is designed to get the maximum performance from a well-trained conditioned dog. It won't make up for poor preseason conditioning and a lack of training. If your hunting trip or local opener is just around the corner, get started on conditioning and training today. That will make a bigger difference than these advanced feeding and hydration strategies. However, when faced with tough hunting conditions, Dr. Reynolds' research just might have the answers for getting the extra mile out of your super hunting dog.

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